

BARNES®

SERVICE MANUAL

SGPC 1 HP Pump



Models Effected:
SGPC10S4L
SGPC10S4AUE
SGPC10S4AUF



IMPORTANT!

*Read all instructions in this manual before operating pump.
As a result of Crane Pumps & Systems, Inc., constant product improvement program,
product changes may occur. As such Crane Pumps & Systems reserves the right to
change product without prior written notification.*

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Form No. SM116452-Rev. A

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SAFETY FIRST!

Please Read This Before Installing Or Operating Pump.

This information is provided for **SAFETY and to PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



IMPORTANT! Warns about hazards that can result in personal injury or indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

CAUTION ! Warns about hazards that can or will cause minor personal injury or property damage if ignored. Used with symbols below.

WARNING ! Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burns or death could result.



Extremely hot - Severe burns can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can cause hazardous pressure, eruptions or explosions could cause personal injury or property damage.



Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



WARNING ! - To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances.



WARNING! - To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.

Prevent large articles of clothing, large amounts of chemicals, other materials or substances such as are uncommon in domestic sewage from entering the system.

During power black-outs, minimize water consumption at the home(s) to prevent sewage from backing up into the house.

Always keep the shut-off valve completely open when system is in operation (unless advised otherwise by the proper authorities). Before removing the pump from the basin, be sure to close the shut-off valve. (This prevents backflow from the pressure sewer.)

Keep the control panel locked or confined to prevent unauthorized access to it.

If the pump is idle for long periods of time, it is advisable to start the pump occasionally by adding water to the basin.



CAUTION! Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



WARNING! - **DO NOT** pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.

Do not block or restrict discharge hose, as discharge hose may whip under pressure.



WARNING! - **DO NOT** wear loose clothing that may become entangled in the impeller or other moving parts.



WARNING! - Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.

Make sure lifting handles are securely fastened each time before lifting. Do not operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair.

Do not exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.

Secure the pump in its operating position so it can not tip over, fall or slide.

Cable should be protected at all times to avoid punctures, cut, bruises and abrasions - inspect frequently.



Never handle connected power cords with wet hands.



To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



Submersible Pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is common.

Do not remove cord and strain relief. Do not connect conduit to pump.



Products Returned Must Be Cleaned, Sanitized, Or Decontaminated As Necessary Prior To Shipment, To Insure That Employees Will Not Be Exposed To Health Hazards In Handling Said Material. All Applicable Laws And Regulations Shall Apply.



Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications. For non-leaded copper alloy materials of construction, please contact factory.



IMPORTANT! - Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

TOOL LIST



- Crescent Wrench
- Torque Wrench
- Hammer
- Brass Flat Punch
- 3/8" Ratchet
- 1/2" Wrench Open End
- 2 - 3/16" Flat Blade Screwdrivers
- 1/4" Nut Driver
- 1/8" Allen Wrench
- 5/32" Allen Wrench
- 5/16" Allen Wrench
- Needle-Nose Pliers
- Inside & Outside Snap Ring Pliers
- 1/4-20 Bolt
- Seal Pushers - Part No: TL-21381
- "Bullets"-Thread Protectors - Part No: TL-21381 / TL-21375
- Grease - White Food Grade with PTFE
- Seal Lubricant (P-80)
- Dielectric Cooling Oil (Check Chart)
- Green 609, Loctite
- Pressure Gauge Kit - Part No: 085343
- Megohmmeter & Multi-Meter w/Clamp

SGPC 1HP Disassembly

Visual Inspection of Pump

Quick visual inspections can save time. A visual Examination of the pump for damage to cords, controls, or cutter, and a thorough electrical check should be performed to determine a pumps condition.

Cut Cords

Check the cord(s) for any cuts or gouges. If there is any noticeable damage, do not use the cord, remove, and install a new cord if applicable.

Megger the Pump Leads - (Megohmmeter)

This test is to determine the strength resistance of the cord insulation. The meter will test zero Ω if the cord insulation is damaged or breaking down thus allowing current to flow through the insulation.

This test can best be performed if the pump leads are disconnected from the control panel, or the junction box. To perform this test, touch one lead to the green ground. Touch the other lead to the white wire. Repeat this test with ground to black. To pass this test, a cord set must have a reading of 5m Ω or higher on all leads. Note that a "0" reading indicates a dead short.



CAUTION: After performing a megger test ALWAYS discharge cord set leads to ground.

Hi-Pot (High Potential) Insulator Test (if required)

A Hi-Pot test of pump leads is more accurate than a megger test, either method will indicate the condition of cord insulation. In most cases, it is not necessary to do both.

This test detects non-visible insulator failures. To perform the HiPot test, a 500 VOC Megohmmeter is needed. Touch the green ground lead from the pump to one of the meter leads, and the other meter lead to one of the power leads. Repeat this test with all of the power leads. A resistance reading no less than 20m Ω **IS ACCEPTABLE.**



CAUTION: After performing a Hi-Pot test, ALWAYS discharge cord set leads to ground.

Check the Resistance - (Multi-Meter)

CAUTION: Perform this test with the pump off.

This test is to check for open circuits or loose connections and also to determine if the motor windings are good.

To perform this test, touch one meter lead to the black cord and the other meter lead to the white cord. The result of this test should give a reading of 0.9 to 2.3. If the results vary, the windings or wiring is faulty.

Compare the readings to the readings found on motor windings resistance charts (Table 1). Readings should be within $\pm 5\%$ of nameplate.

TABLE 1: Motor Winding Resistance

MODEL No.	HP 60Hz (50Hz)	VOLTS	PH	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D.	WINDING RESISTANCE MAIN-START
SGPC10S4L	1 (.6)	240	1	D	9.6	29	12/3	SOW	.61 (15.5)	0.9 -- 2.3
SGPC10S4AUE	1 (.6)	240	1	D	9.6	29	12/5	SOW	.71 (18)	0.9 -- 2.3
SGPC10S4AUF	1 (.6)	240	1	D	9.6	29	12/5	SOW	.71 (18)	0.9 -- 2.3

Winding Resistance $\pm 5\%$. Pump Rated For Operation at $\pm 10\%$ Voltage at Motor.

Jammed or Worn Cutter

Check the cutter for freedom of movement, the cutter should move by hand. Also check for excessive wear, if there is evidence of this, then the worn piece(s) must be replaced.

NOTE: If the cutter is excessively worn, the shredding ring may be reversed.

Check for Stator / Rotor Abrasive Wear

The stator and rotor surfaces should remain smooth throughout normal usage. If there is evidence of excessive wear, including scaring or grooving of the stator boot or rotor surface, then the bottom of the basin could contain abrasives. Abrasives to look for are sand and or rocks.

Stator Failure Evaluation

Stator Failure Evaluation

Stator failure is determined by looking at the inside and outside of the stator boot. Any evidence of a tear or crack on the surface of the boot is an indication that the stator must be replaced.

Moveable Alignment

To prevent the moveable from leaking, make a visual check from the face of the moveable to the lower pump bracket. The face of the moveable needs to be parallel to the lower pump bracket. When assembled on the pump, the moveable face will be perpendicular to the centerline of the pump discharge.

Cutter Removal



CAUTION: Sharp edges, use caution when removing cutter.

NOTE: Prior to disassembly, mark castings with a permanent marker on all joints to assist in realignment.

With the pump lying on its side, remove the cutter retaining screw and washer. The screw has green loctite so apply heat to the screw, wedge a flat blade screwdriver or similar item, between cutter and shredding ring and remove screw. Using a flat punch and hammer, tap the cutter in the counterclockwise direction and remove. A large flat bladed screwdriver may be required to hold the motor shaft while unthreading the cutter. **DO NOT attempt to remove the volute before removing the radial cutter.**



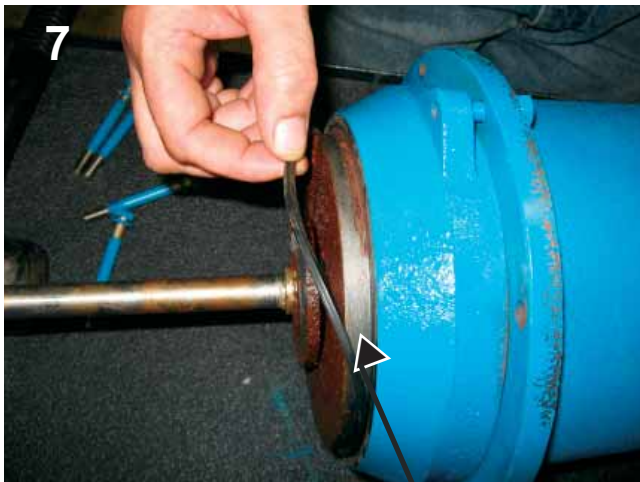
NOTE: DO NOT USE EXCESSIVE HEAT, IT WILL DAMAGE THE PUMP.



HOLD SCREWDRIVER WHILE TURNING CUTTER COUNTERCLOCKWISE

Suction Housing

Loosen the four 5/16 hex head bolts and lock washers from the rim of the motor housing. Remove suction housing and O-ring from the bottom of the seal plate.



Inspect O-ring for signs of wear and abrasion

Pump Rotor

The pump rotor may have come off with the removal of the suction housing and may be inside the pump stator. If it did not, slide the rotor off the shaft.



Pump Stator

The stator has four allen screws securing it to the suction housing (The screws are secured with loctite, apply heat to remove screws). Loosen the screws and lift the retainer plate off. Pull the stator out of the suction housing. The shredding ring is press fit to the suction housing and requires the use of a bearing puller to remove.



NOTE: After a number of years of service or whenever the shredding ring cutting edges dull, the ring can be pressed out of the volute and reversed to utilize the opposite cutting edges. To maintain efficient grinder pump operation, care should be taken to keep both the radial cutter and shredding ring cutting edges sharp. Neither part can be sharpened to renew the cutting ability. The radial cutter must be replaced and the shredding ring either reversed or replaced.

Oil Removal

Set unit on its side and remove plug from motor housing, drain all oil from motor chamber.

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Perform Pressure Check

NOTE: This test is to be performed with NO oil in the housing.

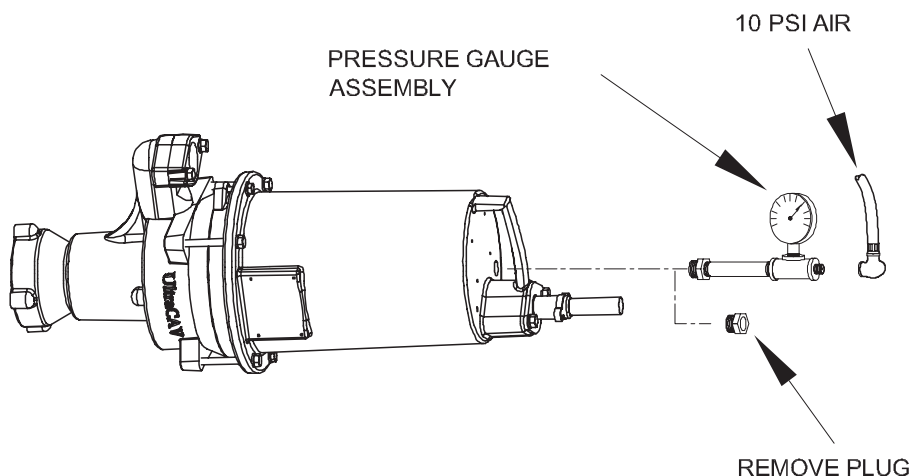


CAUTION: Make certain that cord set is attached to pump. Performing the pressure check without the cord set on may cause the terminal block to blow out.

To check the pump for any seal leaks, attach the pressure gauge assembly using pipe sealant. Tighten the fitting into the hole. Pressurize the gauge to 8 to 10 psi. If pressure drops, use a soap solution around the sealed areas to determine the location of the leaks.

If after 5 minutes the pressure is still holding constant, and no bubbles are observed, slowly bleed the pressure and remove the gauge assembly. Replace the pipe plug using sealant.

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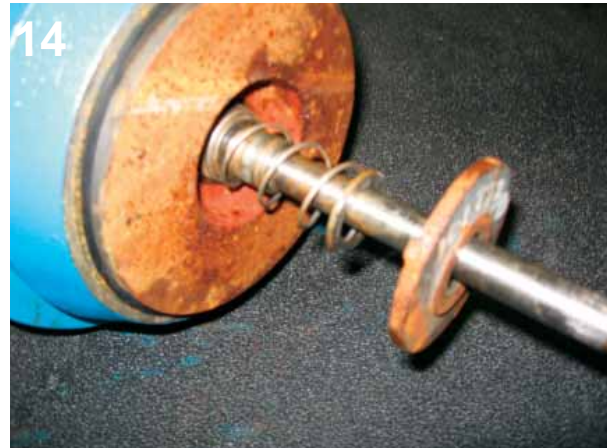


Outer Shaft Seal & Pump Out Spacer

CAUTION: Handle seal parts and shaft with extreme care. Do not scratch or mar lapped or machined surfaces.

Remove snap ring and pump out spacer from shaft. The rotating member and seal spring can also be removed at this time. Examine all seal parts and especially contact faces.

DO NOT interchange seal components. Replace the complete seal assembly if replacing seal.



Inspect seal for signs of wear, such as uneven wear pattern on stationary members, chips, and scratches on either seal face.



Motor Housing

NOTE: Position unit upright, using wooden blocks or on suction housing to avoid resting unit on the lower shaft.

Loosen cable clamp bolts and lock washers from motor housing. Remove cord from motor housing by pulling straight up while using a rocking motion.



Remove retaining snap ring with a medium flat tip screwdriver. Using a 1/4-20 bolt, thread it into the center of the terminal block. Pull straight up with a rocking motion to remove the terminal block. Disconnect all wire connections noting where each wire is connected. The bottom of the block has a number located next to each pin for reference. If pump is equipped with closed valve protection, or automatic level control option, remove in same manner as the power cord.



Pry Snap Ring out
with a screwdriver

Seal Plate

Remove two hex head bolts from seal plate. Remove seal plate and square ring from intermediate coupling.



Motor

With the pump still on the blocks, loosen the motor stator bolts. Lift off the motor stator. Check that the wave washer is present when removing the motor stator. It may be in the motor end bell housing



CAUTION: Use care not to damage motor windings when removing motor.



Bearing

Press the motor rotor out of the seal plate using an arbor press. Make sure to press straight down on shaft while protecting threads from damage. Use a wheel puller or arbor press to press bearing off of the motor shaft. The upper motor bearing can be removed with a wheel puller.



Remove the stationary seal by pressing out with a flat tipped screwdriver. Examine all seal parts and especially contact faces. Inspect seal for signs of wear, such as uneven wear pattern on stationary members, chips, and scratches on either seal face.

DO NOT interchange seal components, replace the complete seal assembly if replacing seal.



Pin Placement Diagram

Wiring Schematic For Pumps With Dual Hole Motor Housing

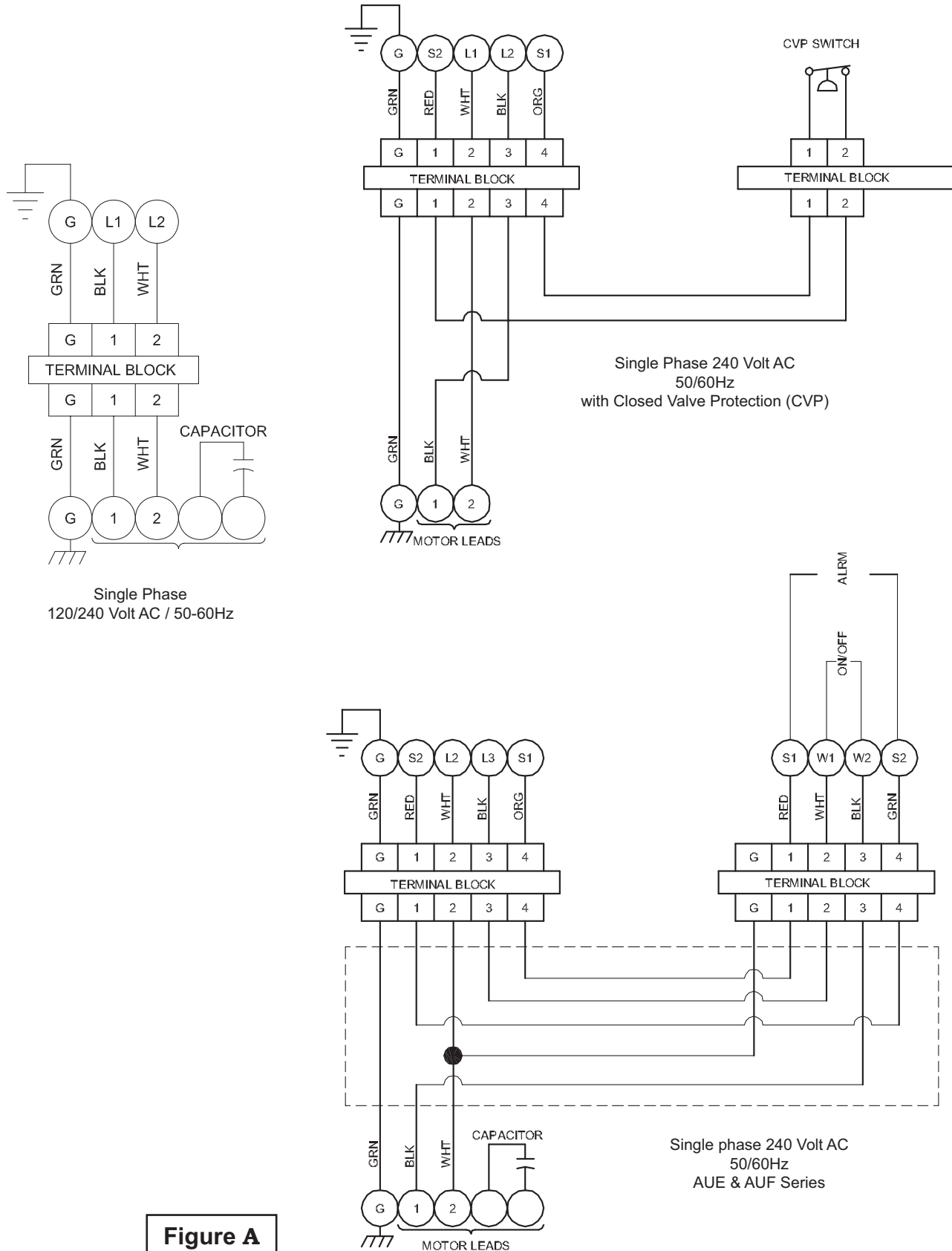


Figure A

Replacing Oil

NOTE: Repeat all electrical checks and pressure tests prior to replacing oil.

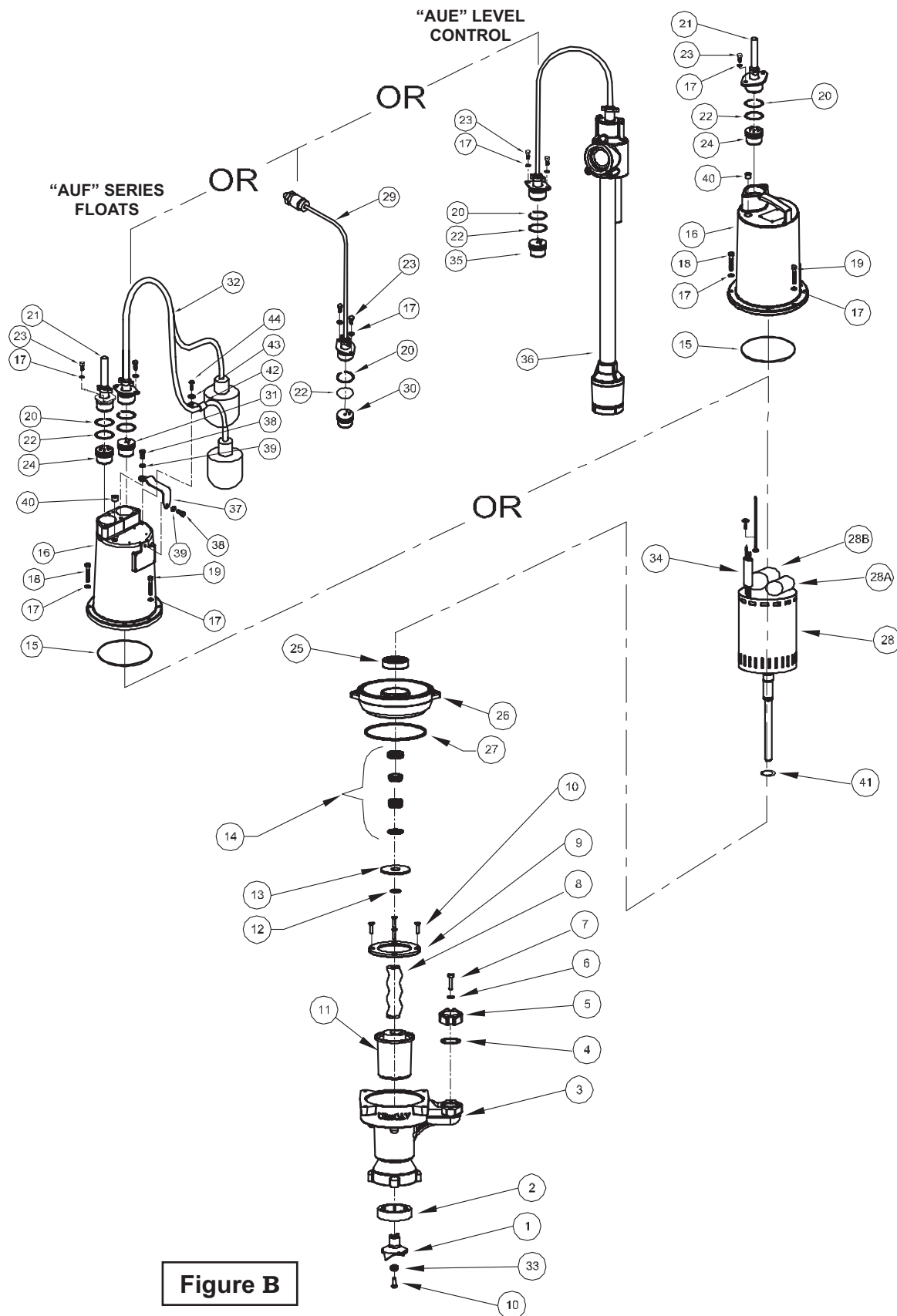
Motor housing - Set unit upright and refill with (see chart for type and amount) new cooling oil. Fill to 1" above motor as an air space must remain in the top of the motor housing to compensate for oil expansion. Apply pipe thread compound to threads of pipe plug and assemble to motor housing.

NOTE: Reference oil chart for suitable replacement oils.

SUPPLIER	GRADE
BP	Enerpar SE100
Conoco	Pale Paraffin 22
Mobile	D.T.E. Oil Light
G & G Oil	Circulating 22
Imperial Oil	Voltesso-35
Shell Canada	Transformer-10
Texaco	Diala0 Oil-AX

REASSEMBLE IN REVERSE ORDER.

Exploded View of SGPC 1 HP



PARTS KITS

Seal Repair Kit.....P/N: 116828

Overhaul Kit P/N: 116829

Cutter Kit P/N: 116830

Rotor/Stator Kit.....P/N: 118526

Item #'s 6, 7, 8, 10, 12, 14, 15, 19, 20, 22, 23, 27, 33, 34, 40

116828 & Item #'s 11, 28A, 28B, 28C, 41

Item #'s 1, 2, 10, 19, 33

Item #'s 8, 11

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	101774	Radial Cutter
2	1	082085	Shredding Ring, SS
3	1	116440	Suction Housing
4	1	625-01558	O-Ring
5	1	108369	Flange, CI, 1.25" NPT
6	2	062941	Flat Washer 5/16, SS
7	2	1-131-1	HXHD Screw 5/16-18 x 1.25", SS
8	1	117679	Rotor
9	1	101772	Stator Plate
10	5	070704	FLTHD, HXSKT Screw 1/4-20 x .75", SS
11	1	117678	Stator
12	1	116442	Retaining Ring
13	1	101773B	Suction Spacer
14	1	111131SD	Mechanical Seal - SC/SC/B
15	1	095368	Tetra Seal - 261
16	1	108342 110328	Motor Housing (STD) Motor Housing (AU & CVP)
17	8	026322	Lock Washer 5/16, SS
18	4	1-131-1	HXHD Screw 5/16-18 x 1.25", SS
19	4	1-300-1	HXHD Screw 5/16-18 x 3.00", SS
20	1	105197	Retaining Ring
21	1	109498 113274	Cord Set - 12/3, 15 Ft. (STD) Cord Set - 12/5, 15 Ft. (AU & CVP)
22	1	2-31051-224	O-Ring
23	2	1-156-1	Hex Hd Screw, 5/16-18 x 1.00", SS
24	1	103760	Terminal Block (STD)
25	1	Q10-36-E4	Ball Bearing - 305

ITEM	QTY	PART NO.	DESCRIPTION
26	1	116451	Seal Plate
27	1	067564	Tetra Seal - 256
28	1	121530	Motor - 120/240Volt, 50/60Hz
28A*	1	116837	Start Capacitor
28B*	1	116838	Run Capacitor
28C*	1	017414	Upper Motor Bearing - 203 (N/S)
29	1	113281	Pressure Switch/Cord - 16/2 (CVP)
30	1	103759	Terminal Block (CVP)
31	1	113272	Terminal Block (AUF)
32	1	113273	Float Switch (AU - Dual)
33	1	067556	Washer .281" x .75" x .25", SS
34	1	625-02117	Sleeving, Fiberglass
35	1	113272	Terminal Block (AUE)
36	1	121676-M	ESPS-150 Level Control (AUE)
37	1	110331	Lifting Handle (CVP, AUF & AUE)
38	2	1-156-1	HxHd Screw, 5/16-18 x 1.00", SS
39	2	026322	Lockwasher 5/16, SS
40	1	014270	Pipe plug, 3/8 NPT
41	1	061143	Retaining Ring
42	1	090516	Float Clip (AUF)
43	1	20-12-1	Washer (AUF)
44	1	11-17-1	RdHd Screw #10-32 x .37 SS (AUF)

Contact your local Distributor or the Factory for other seal materials, cord lengths and other optional equipment.

(*) Included with motor item #28.

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